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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	**Mail Stop Amendment**
Rajesh K. Garg et al.	Group Art Unit: 1731
Application No.: 10/649,787	Examiner: Jose A. Fortuna
Filed: August 28, 2003	Confirmation No.: 5592
For: METHOD AND APPARATUS FOR PREPARING A SLURRY OF ADD-ON MATERIAL TO BE APPLIED TO A WEB	

DECLARATION BY RAJESH K. GARG AND TONY PHAN UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. We are inventors of subject matter claimed in the above-identified application ("the present application").

2. Rajesh K. Garg received a Bachelor's degree from the Indian Institute of Technology, and a Masters Degree in Paper Science and Engineering from Western Michigan University, and an MBA from Virginia Commonwealth University. Rajesh is currently a Senior Research Engineer at Philip Morris USA Inc. , Richmond, Virginia. Philip Morris USA Inc. is the assignee of the present application. Rajesh has worked at Philip Morris USA Inc. since 1989. During this time Rajesh has spent about 12 years working on banded cigarette paper and reduction of smoking constituents.

3. Tony Phan received a Bachelor's degree in Electrical Engineering from the State University of New York, Buffalo. Tony is currently the Manager, Paper Technology, at Philip Morris USA Inc. in Richmond, Virginia. Philip Morris USA Inc. is the assignee of the present application. Tony has worked at Philip Morris USA Inc. since 1975. During this time Tony has spent about 14 years working on banded

cigarette paper, research and development related to banded cigarette paper, as well as process control and project engineering related to banded cigarette paper.

4. We have considered the following patent publications, and we do not believe that any of U.S. Patent No. 5,997,691 ("Gautam"), U.S. Patent No. 3,596,840 ("Blomqvist"), U.S. Patent No. 6,214,166 ("Münchow"), or U.S. Patent Application Publication No. 2005/0167534 ("Tomikawa") provides evidence of the alleged equivalence between wet and dry grinding, either in a papermaking process or in a method for preparing a slurry of add-on material to be applied in a predetermined pattern on a base web. Furthermore, contemporaneous materials confirm that dry grinding is not equivalent to wet grinding in papermaking processes.

5. As the step of preparing the slurry of add-on material (which is repetitively discharged upon the moving base web) includes cooking a fibrous cellulosic material, bleaching the material, pressing the cooked and bleached material to remove liquid, drying the pressed material, milling the dried material to produce fibers of a desired size, and mixing the milled material with water to hydrate the material and produce a slurry, one of ordinary skill in the art ***would*** need to be concerned with variables outlined below.

6. While the prior art specifically discloses the use of wet grinding in papermaking, the prior art also specifically explains why dry grinding is not a suitable substitute for wet grinding in papermaking. Accordingly, we believe that the prior art teaches away from substituting dry grinding for wet grinding in papermaking. Thus, it is our belief that one of ordinary skill in the art would not equate wet grinding and dry grinding in the papermaking art.

7. From our review, the Gautam patent does not disclose a dry grinding process or apparatus. As explained in the present specification, "dry grinding" results in add-on material having a very narrow range of cellulose fiber lengths, and as a result the areas of the cigarette paper having the add-on material provide

consistent and predictable performance. In addition, the add-on material is produced in much shorter time while consuming less energy than would be required to produce similar add-on material having a comparably narrow range of fiber lengths using techniques where a wet slurry material is repeatedly refined using multi-disk refiners. (Page 3, Paragraph [0010]).

8. From our review, the Blomqvist patent provides a process for producing cellulose fluff, a disintegrated dry cellulose fiber product used as an absorbent material in such items as diapers, absorbent pads and rolls, and the like. (Abstract). In column 1, Blomqvist in fact teaches some of the advantages of producing cellulose fluff starting from pulp in sheet form, instead of loosely compressed roll pulp. With regard to wet grinding, Blomqvist merely discloses, "it is surprising that it is possible to treat dry pulp in a disk refiner in which otherwise only wet pulp can be treated." (Column 1, Lines 58-60).

9. Moreover, from our review, Blomqvist expressly notes that earlier experiments showed that pulp could be burnt in the refiner (Column 1, Lines 60-63) – a fact which precludes use in paper where brightness is one of the most important characteristics. *See, e.g.*, http://www.paperonweb.com/pulppro.htm.

10. Thus, based on our review, Blomqvist does not provide any evidence of the equivalence of wet and dry grinding in papermaking. Rather, the Blomqvist process produces dry cellulose fluff fibers as a final product for use as an absorbent material, but not a slurry formed by mixing disintegrated (fluffed) dry cellulose fibers with water to hydrate the disintegrated (fluffed) dry cellulose fibers.

11. From our review, the Münchow patent relates to a process for recycling fillers and coating pigments during the preparation of paper, paperboard and cardboard. Those fillers and pigments are found in the residual water sludges from coating-plant waste waters, deinking plants, internal water treatment plants or separators. A pigment slurry obtained from the process is then used to prepare a coating compound for the paper industry or as an additive to paper stock for

papermaking. (Abstract). Münchow discloses that the residual water sludges are first given desired whiteness and fineness by mixing and then milling together with (i) fresh pigments, (ii) fresh fillers in the form of powders, (iii) fresh-pigments containing slurries, and/or (iv) fresh-filler containing slurries. That processed sludge is then used as a filler or coating pigment. (Column 3, Lines 17-23). Münchow further discloses, "The mineral fillers and pigments mentioned are usually milled to give the desired grain size in a wet or dry milling method." (Column 3, Lines 23-25). Thus, Münchow does not provide any evidence of the alleged equivalence of wet and dry grinding to attain desired fiber length in a papermaking process, specifically of an add-on material comprising fibrous cellulosic material.

12. Based on our review, the Tomikawa publication also concerns a dry grinding system which is suitable for use in production, for example, of abrasives or filler; as well as a dry grinding method employing the system. (Page 1, Paragraph [0003]). Tomikawa discloses that, in general, ceramic powder such as alumina powder or silicon carbide powder (employed as, for example, abrasive or fillers), is produced through grinding of raw-material powder having a large average particle size. (Page 1, Paragraph [0003]). Tomikawa further states, "Grinding processes include a dry grinding process and a wet grinding process. When a dry product is to be produced by means of a grinding process, in many cases, a dry grinding process, which does not require a drying step, is employed." (Page 1, Paragraph [0003]). Thus, Tomikawa does not provide any evidence of the equivalence of wet and dry grinding in a papermaking process. Tomikawa indicates that raw-material ceramic powder having a large average particle size may be ground to produce ceramic powder (such as alumina powder or silicon carbide powder), where the ceramic powder may then be used, for example, as an abrasive or filler – but does not disclose mixing a milled fibrous cellulosic material with water to hydrate that material and produce a slurry.

13. Among the most important parameters that define a paper pulp are (1) fiber length, (2) brightness, and (3) the pulping process used. *See, e.g.*, http://www.paperonweb.com/pulppro.htm.

14. A key step used to achieve a desired brightness is bleaching. It has been reported that a refining procedure activating a fiber surface before removal of fines had the best effect on the bleachability (*i.e.*, refining ***before*** bleaching) and showed a decrease in bleaching chemical consumption. *See* http://www.woodwisdom.fi/content/Old_Pdf/09_ww.pdf?from=4174734533604717.

15. Thus, the sequence of steps for preparing a slurry of add-on material recited in the presently claimed process, *i.e.*, bleaching, drying, followed by milling of dried material, is neither taught nor suggested by the prior art.

16. As described in *A Critical Review of Current Theories for the Refining of Chemical Pulps*, Project 3384, Report Three: A Progress Report to Members of the Institute of Paper Chemistry, January 9, 1981, Pages 7-8:

> Refining of chemical pulp fibers differs from crushing ore in two respects: (1) the purpose of refining is not solely reduction of size and (2) refining is carried out under the plasticizing action of water. . . . It has been shown that dry grinding easily generates free radicals in the various chemical constituents of the cell wall. Thus, it is clearly established that water acts as a plasticizer and protective medium in the refining process.
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> Because of the presence of water in refining and because of the structural features of the cell wall, one could very well state that the main effect of refining is an opening up of the fiber structure. ***That is not the case if the refining is done in air with a conventional low consistency refiner equipped with a knife tackle. Using normal bar clearance in such a refiner, the chemical pulp fibers are quickly physically and chemically decomposed without any development of internal or external fibrillation.***

(Underlining in Original; Bold Italics Added; Citations Omitted). *See* http://smartech.gatech.edu/bitstream/1853/670/1/3384_003_071981.pdf.

17. Fibrillating may be defined as a fine bleeding of fiber ends, resulting in a close-knit connection between individual fibers. *See The Paper Making Process: From wood to coated paper*, the fifth technical brochure from Sappi Idea Exchange,

at http://www.sappi.com/NR/rdonlyres/9053030F-70C1-439F-B159-634FF890D3F3/0/ThePaperMakingProcessEnglish.pdf.

18. Similarly, as explained in U.S. Patent No. 5,385,640,

> Mechanically beaten celluloses have long been employed in the paper and packaging industry. Chemi-thermomechanically refined wood pulps are typically dispersed in hydrobeaters and then subjected to wet refining in high speed disc mills. This level of structural manipulation as presently practiced is exclusively at the quaternary level. The objective of such processing is to disperse aggregated fiber bundles and increase available surface area for contact during drying to increase dry strength. Substantial size reduction and concomitant impairment of dewatering are undesirable and circumscribe the extent of processing. The measurement of the ease of water drainage from a beaten pulp is termed Canadian Standard Freeness and reflects the ease or rate of interstitial water removal from the paper stock.
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> ***Finely ground or fragmented celluloses are well known. These products are produced by mechanical comminution or grinding of dried, refined cellulose. They are employed largely as inert, non-mineral fillers in processed foods and plastics.*** The manipulation is exclusively at the quaternary level of structure. It is achieved by application of a variety of size reduction technologies, such as ball and bar mills, high speed cutters, disc mills or other techniques described in part in U.S. Pat. No. 5,026,569. The practical limit of dry grinding is restricted in part by the thermal consequences of such processing on cellulose and in part to the economics of equipment wear and material contamination of the product. Micromilled cellulose (MMC) prepared in aqueous or other liquid media as described in U.S. Pat. No. 4,761,203 avoids the thermal decomposition associated with prolonged or intense dry grinding. This technique allows particle size reduction into the colloidal range (about 10 microns). It is believed to operate by indiscriminate micro-fragmentation of quaternary structure, without incurring the fusion/thermal degrading effects characteristic of dry grinding.

(Bold Italics Added; Column 2, Line 49 – Column 3, Line 17).

19. Accordingly, while the prior art specifically discloses the use of wet grinding in papermaking, the prior art also specifically explains why dry grinding is not a suitable substitute for wet grinding in papermaking. Accordingly, the prior art teaches away from substituting dry grinding for wet grinding in papermaking. Thus,

one of ordinary skill in the art would not equate wet grinding and dry grinding in the papermaking art.

20. Dry market pulp is a commodity used as feed stock to a paper mill – it does not represent a step used in further reducing the size of cellulose fibers laid down in a papermaking machine, or a further step in preparing add-on cellulose material. As noted above, both fiber length and brightness are two of the most important characteristics of paper pulp. Dry grinding which would shorten fibers would not be obvious to those skilled in the papermaking art – especially in view of its potential to adversely affect brightness due to discoloration associated with high friction and potential burning of fibers.

21. The presently claimed processes are not directed to the production of dry market pulp. Rather, as noted above, the presently claimed method of manufacturing a web having an applied pattern of add-on material comprises moving a base web along a first path; preparing a slurry of add-on material and repetitively discharging the slurry of add-on material upon the moving base web. The step of preparing a slurry of add-on material includes: cooking a fibrous cellulosic material, bleaching the material, pressing the cooked and bleached material to remove liquid, drying the pressed material, milling the dried material to produce fibers of a desired size, and mixing the milled material with water to hydrate the material and produce a slurry.

22. As explained above, "dry grinding" results in add-on material having a very narrow range of cellulose fiber sizes, and as a result the areas of the cigarette paper having the add-on material yield consistent and predictable performance. With this process, the add-on material is produced in much shorter time and consumes less energy than would be required to produce similar add-on material having a comparably narrow range of fiber sizes using multiple wet-slurry refining steps.

23. The presently claimed combination of steps provides important advantages; namely, (i) as outlined in the present specification, better control of fiber length for the add-on material, giving a more consistent and predictable performance of the banded paper (Page 3, Paragraph [0010], Lines 4-7), and (ii) savings in time and energy consumption during manufacturing operations (Page 3, Paragraph [0010], Lines 7-9, and at Page 6, Paragraph [0017]). Accordingly, the claimed combination both enhances the ultimate product and presents a novel combination of steps of making the ultimate product. The claimed combination of steps and the advantages thereof are neither taught nor suggested by the prior art of record.

24. Münchow discloses that: "In the preparation of paper, the raw material, i.e. wood pulp, wood, fine straw pulp or rag pulp, is admixed with paper pulp, fillers and pigments in order to achieve a closed surface and thus to improve the properties of the paper, especially the ***whiteness***, opacity and printability." (Column 1, Lines 23-27). And as Gautam explains, the preparation of slurry for production of cigarette paper initiates with cooking of flax straw feed stock, followed by a ***bleaching*** step and one or more refining steps, which are configured to achieve a weighted average fiber length in the flax slurry of approximately 0.8 to 1.2 mm. (Column 12, Lines 42-53). In conventional paper preparation, whiteness is a desired property.

25. In contrast, the present specification claims that add-on material to be applied in a pattern to a base web of cigarette paper is produced by cooking a fibrous cellulosic material, bleaching the material, pressing the cooked and bleached material to remove liquid, ***drying*** the pressed material, ***milling*** the dried material to produce fibers of a desired size and mixing the resulting material with water to obtain the slurry of add-on material. (Page 4, Lines 1-6). Preferably, the milling step is configured to achieve a weighted average fiber length of approximately 0.5 to 1 mm. (Page 4, Lines 6-8). The bands of add-on material on the base web have fibers that are shorter than the fibers in the base web as a result of the processes performed on the add-on material. (Page 5, Lines 11-13).

26. The conditions involved with drying the pressed material, as well as milling or grinding the dried material, can cause discoloration of the material. In particular, heat introduced during drying, milling, and/or grinding can cause scorching of the material. Accordingly, in conventional preparation of paper (see reference cited above), dry grinding is not used, because long fibers, which have not been scorched or degraded, are desired to produce white paper. Thus, the prior art teaches away from the use of dry grinding, which can affect the desired whiteness in conventional preparation of paper.

27. For all these reasons, the prior art teaches away from substituting dry milling for wet grinding in papermaking. We do not find a factual basis for asserting that dry milling is the equivalent of wet grinding.

28. By signing this document, I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 3/10/2008

Rajesh K. Garg

Date: 3/10/2008

Tony Phan